



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/525,183	03/14/2000	Satoshi Ishizaka	NEC 99641	7845
27667 7590 04/28/2009 HAYES SOLOWAY P.C. 3450 E. SUNRISE DRIVE, SUITE 140 TUCSON, AZ 85718				
EXAMINER PERT, EVAN T				
ART UNIT		PAPER NUMBER		
2826				
MAIL DATE		DELIVERY MODE		
04/28/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/525,183

Applicant(s)

ISHIZAKA ET AL.

Examiner

EVAN PERT

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/14/2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 March 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/C2)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- _____ Paper No(s)/Mail Date 0801, 1000.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

At p. 2, line 14, "line" should read --line.--.

At p. 9, line 5, "interactive energy of 20,000K" should read "interactive energy calculated at 20,000K," since 20,000K is temperature, not energy.

The sentence at p. 4, lines 7-12, including "the absolute temperature" is unclear since there is no antecedent basis for "the absolute temperature," which seems to be a temperature higher than room temperature in Kelvin; the sentence is taken to mean that "interactive energy between adjacent domains is enough to allow operation at the operational ambient temperature." See p. 8, line 4. See "absolute temperature" of "10,000K" at p. 8, lines 3 and 19, and "20,000K" at p. 9, line 5.

The sentence at p. 6, lines 5-10 has the same grammatical problem as the sentence at p. 4, lines 7-12.

Appropriate correction is required.

Information Disclosure Statements

2. The information disclosure statements filed October 2000 and August 2001 fail to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. The references not available have been lined through and were not considered.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation "the absolute temperature" in lines 3-4, yet there is insufficient antecedent basis for this limitation in the claim.

For purposes of examination, claim 4 is interpreted as reciting that "an interactive energy acting between dipoles in adjacent magnetic domains is designed to allow operation at room temperature, such as designed based on calculations at 10,000K or 20,000K." [e.g. see p. 8, line 4].

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 and 7-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Fuller (US 3,369,225).

Applicant's claims 1-5 and 7-16, not specifically drawn to iron dots physically spaced apart on a silicon substrate to form a magnetic transmission line, for example, but rather broadly claimed "magnetization domains" that "transfer a signal," do not distinguish from prior art having magnetization domains that transfer a signal, such as US 3,369,225.

Regarding claim 1, the '225 reference discloses a magnetic signal transmission line (i.e. a magnetic signal transmission line from one end of substrate 12 to the other end along the y direction as depicted in the cover figure) comprising a substrate (12) having a main surface, and a plurality of single-magnetization domains arranged in a one-dimensional array on said main surface (i.e. single magnetization domains that form in the ferroelectric material layer as seen by arrows directed in alternating directions along the transmission line path along the y axis direction), each of said single-magnetization domains having a magnetization (i.e. shown by arrow direction), whereby a signal is transferred along said one-dimensional array by a change of said magnetization (i.e. unit 19 changes the direction in layer 10 at 16 to alternate magnetization direction to propagate a magnetic signal along the y axis direction in the cover figure per col. 1, lines 65-69 where data is "propagated" magnetically).

Regarding claim 2, the '225 reference discloses that the single-magnetization domain is formed in a magnetic material having a spontaneous magnetization (i.e. layer 10 is a magnetic material that has a spontaneous magnetization such as "Permalloy" per col. 3, lines 41-43).

Regarding claim 3, the '225 reference discloses the magnetic material is a ferromagnetic substance (col. 3, line 41).

Regarding claim 4, in view of the rejection under 35 USC 112 set forth in this office action, the '225 reference discloses that an interactive energy acting between dipoles in adjacent two of said single-magnetization domains in terms of the absolute temperature is larger than an operational ambient temperature (since the adjacent domains interact and propagate a signal so they inherently have an interactive energy that allows propagation at an operating temperature).

Regarding claim 5, the '225 reference discloses single-magnetization domains have an easy axis which is parallel to said main surface (col. 3, lines 46-52).

Regarding claim 7, the '225 reference discloses that the easy axis is perpendicular to a direction of said one-dimensional array (i.e. the x axis of the cover figure per col. 3, lines 46-52).

Regarding claim 8, the '225 reference discloses that each of said single-magnetization domains has a height smaller than both a width and a length thereof (because the '225 reference discloses that the thickness of the ferromagnetic layer could be a little as "100 angstroms" per col. 3, line 45).

Regarding claim 9, the '225 reference discloses that each of said single-magnetization domains has a width equal to or larger than a length thereof (i.e. the "width" along the x direction as defined by applicant's specification is wider than the "length" as defined in the y direction in accordance with applicant's specification).

Regarding claim 10, the '225 reference discloses that each of said single-magnetization domains is separated from an adjacent one of said single-magnetization domains with a space disposed therebetween (i.e the domain wall could be considered a separating space depicted as gaps between the arrowed domains in the cover figure).

Regarding claim 11, the '225 reference discloses that each of said single-magnetization domains is distributed as a part of a continuous unit of the magnetic signal transmission line (i.e. the unit could also be considered as a continuous line since the layer 10 is not discontinuous).

Regarding claim 12, the '225 reference discloses that the single-magnetization domains are arranged periodically in said one-dimensional array (as seen in the cover figure).

Regarding claim 13, the '225 reference discloses that each of said single-magnetization domains has an anisotropic energy which resides between zero, and 120% of interactive energy acting between dipoles in adjacent two of said single-magnetization domains (inherently, since there is signal propagation in the y direction of the magnetic signal transmission line).

Regarding claim 14, the '225 reference discloses a method for transmitting a signal by using a one- dimensional array of a plurality of single-magnetization domains, said method comprising the steps of applying a magnetic field to at least one of the single-magnetization domains to cause a change of magnetization therein, and detecting a magnetization of another of said single-magnetization domains (as can be clearly seen in the cover figure alone of the '225 reference wherein there is data

propagation by alternating magnetic domains seen as arrows in the ferromagnetic material 10).

Regarding claim 15, the '225 reference discloses that the change of magnetization includes a change of direction of a spontaneous magnetization (such as described at col. 4, lines 55-64).

Regarding claim 16, the '225 reference discloses that the change of magnetization is transferred as a solitary wave (such as described at col. 4, lines 55-64).

Allowable Subject Matter

5. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
6. The following is a statement of reasons for the indication of allowable subject matter:

Generally, while not specifically claimed, the prior art does not disclose spaced apart islands of ferromagnetic material that are sized to be single magnetization domains and are arranged on a substrate to transmit a signal magnetically along a one-dimensional array of the islands (i.e. dots), such as along iron dots on a silicon substrate, which avoids RC delay when a signal is propagated by movement of electrons through a conductor, and differs from an electromagnetic wave being propagated down a waveguide.

Regarding claim 6, the prior art does not disclose or suggest the invention as claimed in claim 1 when additionally characterized that the easy axis is parallel to the substrate and is also parallel to a direction of the one-dimensional array of the magnetic transmission line.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to EVAN PERT whose telephone number is (571)272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ETP
April 26, 2009

/Evan Pert/
Primary Examiner, Art Unit 2826